1095-65 **Evaluation of Resynchronization of Contractile Function Following Biventricular Pacing Using Colour Tissue Doppler Imaging**

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Biventricular (BV) pacing is evaluated as an alternative treatment for patients with dilated cardiomyopathy (both ischemic and non-ischemic) and end-stage heart failure. Colour tissue Doppler imaging using echocardiography allows noninvasive, quantitative assessment of radial motion in the long-axis with measurement of peak systolic velocity timing. The aim of the present study was to evaluate quantitatively, the systolic performance of the left ventricle and the resynchronization of contraction (before vs after implantation).
Patients and methods: 25 patients with dilated cardiomyopathy (11 ischemic), NYHA class III or IV, QRS duration >120 ms received a biventricular pacemaker. Routine 2D echo and colour tissue Doppler imaging were performed before and within 1 week following implantation. LVEF was assessed using the biplane Simpson's method.Peak systolic velocity (PSV) and time to PSV (TPV) were assessed in 4 regions (basal anterior, inferior, lateral and septal). By averaging the TPV from all 4 regions, a synchronization index was derived from these measurements.
Results: LVEF improved by 9±9% following pacing; 17 patients improved LVEF 5% or more. The change in PSV in the septal and lateral regions related significantly to the change in LVEF (r=0.74, r=0.62).The change in synchronization index before vs after pacing (as a measurement of REsynchronization) was related to the change in LVEF (y=120x+5.6, r=0.79, P<0.01). Using a change in synchronization of 40, a sensitivity of 76% and a specificity of 100% were obtained to predict improvement of LVEF.
Conclusion: Colour tissue Doppler imaging allows assessment of resynchronization of contraction following BV pacing and may be used to predict change in LVEF.

1095-66 **Quantitative Three-Dimensional Echocardiography Using an Ultrafast Rotating Transthoracic Scanner for Evaluation of Ventricular Function in Humans**

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PURPOSE: Sequential real-time data acquisition is a novel method of data acquisition for 3-dimensional echocardiography (3DE). A newly developed ultrafast rotating transthoracic scanner (URS) can be connected to a standard ultrasound platform. This study was undertaken to validate the quantification of left ventricular (LV) volumes using URS in humans.
METHODS: 16 adults (mean age 49±18, mean body surface area 2.02 m2) were studied using 3 methods of transthoracic LV volume quantification: 2-dimensional Simpson (2D), disc summation from gated 3DE (Tomtec Echoscan 4.0, Munich) and disc summation from ultrafast three-dimensional acquisition performed using second-generation URS (RT3D). Studies were performed using GE/Vingmed System FiVe in 2.2/4.4MHz harmonic mode with image settings optimized for LV endocardial border detection. Real-time acquisition was based on data collection in a digital cine loop during a fast (360 rpm) rotation of the URS array without ECG or respiratory gating. RT3D data analysis was performed after transfer to Matlab 5.3 environment.
RESULTS: 39 successful acquisitions were performed providing datasets collected at mean 25-degree rotational interval with temporal resolution of 12 volumetric datasets per second. 3D data acquisition lasted 106±54s vs 5±0 s for RT3D (p<0.0001). Measured LVEF ranged 10-68%, mean 48±15% and was overestimated in 2D (48%) versus both 3D modes (ANOVA p=0.037). This resulted from underestimation of LVESV by 2D (86ml vs 93ml /RT3D and 96ml /3D, ANOVA p=0.008). The mean differences according to Bland and Altman were: RT3D vs 3D - -4±13ml (NS); -3±8ml, (NS); -0.4±4.8%, p=NS; for RT3D vs 2D - 2±17ml, (NS),7±13ml (p=0.054); -3.8 ± 6.8% (p=0.042); for 3D vs 2D - 6±20ml (NS), 10±15ml, (p=0.01), -3.4± 6.4% (p=0.048) for LVEDV, LVESV and LVEF, respectively.
CONCLUSIONS: Real-time 3DE performed with an ultrafast rotating scanner connected to a standard echo system enables accurate quantification of left ventricular volumes and ejection fraction, with very close agreement with gated three-dimensional reconstruction. Acquisition time of 5 seconds allows easy incorporation of the procedure into a standard echocardiographic study.

POSTER SESSION

1096 Assessment of the Coronary Arteries With Computed Tomography: New Approaches and Applications

Monday, March 18, 2002, 9:00 a.m.-11:00 a.m.
Georgia World Congress Center, Hall G
Presentation Hour: 10:00 a.m.-11:00 a.m.

1096-54 **Risk Factor Associations With Coronary Calcium: A 4-Slice Multidetector CT Study With Prospective ECG Triggering in 2,030 Subjects**

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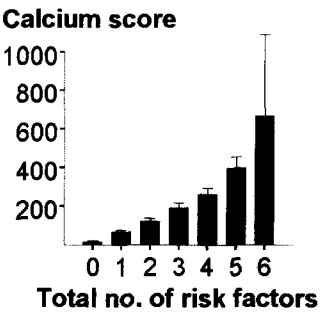
Multidetector (4-slice) spiral CT (4-S-CT) has become available as a novel modality for quantifying coronary calcium. It has not been tested if coronary calcium determined by 4-S-CT is associated with the presence of established cardiovascular risk factors.
Methods: A total of 2,030 subjects asymptomatic for CAD (56 ± 10 years, 75% men) referred by their physician were examined using an Mx-8000 4-S-CT (Philips, formerly Marconi, Cleveland, Ohio). Scanning was done with prospective ECG-triggering at 60% of the RR interval using a slice width of 2.5 mm and a protocol very similar to the MESA (Multi-Ethnic Study of Atherosclerosis) in the USA. Coronary calcium was quantified in analogy to the Agatston criteria. Cardiovascular risk factors were assessed by questionnaire.
Results: Coronary calcium was detected in 990 (65%) men and 248 (48%) women ($p < 0.001$). Age, gender and all of the established causal risk factors (systemic hypertension, active smoking, hypercholesterolemia, and diabetes) were independently associated with the calcium score. With an increasing number of these risk factors, the calcium score increased (figure shows mean ± SEM).



Conclusion: The association with risk factors suggests that coronary calcium determined by 4-S-CT and prospective ECG-triggering in a similar fashion as in MESA provides useful information about the presence and extent of coronary atherosclerosis.

1096-55 **Age and Gender Distribution of Coronary Artery Calcium Measured by 4-slice-CT in 2030 Individuals Asymptomatic for Coronary Artery Disease**

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For accurate quantification of coronary calcium, electron-beam computed tomography (EBCT) is currently being regarded as the "gold standard". Recently, four-slice (4-S)-CT has become an alternative, new modality. However, neither a standard image acquisition protocol nor the normal distribution pattern of the calcium score in asymptomatic individuals have been established. The MUNICH registry (MUltislice Normal Incidence of Coronary Health) consecutively collects these data using 4-S-CT (Mx8000, Marconi/Philips) and prospective ECG-triggering in analogy to the MESA protocol (4x2.5 mm). Results: Age, gender and all of the determined risk factors were independently associated with the Agatston calcium score. Age and gender specific 10th, 25th, 50 th, 75 th and 90 th percentiles of the Agatston score distribution were established and will be presented. There was a good agreement with percentile values derived from studies using EBCT in 58,289 pats (Raggi, AJC, 2001; table).
Conclusions The similarity with percentile values previously reported in EBCT-studies suggest that 4-S-CT provides useful information about the presence and extent of coronary atherosclerosis. Since the data acquisition of the current study is comparable to the method used for the MESA study currently performed in the USA, the data from the MUNICH registry will be comparable to the 4-S-CT data from the MESA-study.

75th percentiles of 4-S-CT and EBCT

	40-44 y	45-49 y	50-54 y	55-59 y	60-64 y	65-70 y
male: 4-S-CT	3.8	40.3	98.6	200.6	246.6	553.2
male: EBCT	8.9	35	100	211	397	614
female: 4-S-CT	0.9	0	3.3	24.7	49.1	102.8
female: EBCT	0.5	1.5	6	24	68	148